MEMORANDUM OF UNDERSTANDING

BETWEEN

THE DEPARTMENT OF ENERGY OF THE UNITED STATES OF AMERICA

AND

THE INTERNATIONAL ATOMIC ENERGY AGENCY
CONCERNING

SUPPLY OF FEED MATERIAL FP-33

FOR

SEPARATION OF HIGH-PURITY PLUTONIUM-244

This Memorandum of Understanding (hereinafter referred to as "MOU") is made between the Department of Energy of the United States of America (hereinafter referred to as "USDOE") and the International Atomic Energy Agency (hereinafter referred to as the "IAEA"), collectively hereinafter the "Parties".

NOTING the Agreement for Cooperation between the United States of America and the International Atomic Energy Agency of May 11, 1959, which entered into force August 7, 1959, as amended and extended;

NOTING the IAEA's desire to obtain, and USDOE's willingness to supply, small quantities of highly-enriched plutonium-244 for use by the IAEA as an isotopic tracer in nuclear safeguards applications; and

NOTING that the IAEA has entered into a contract (2000-827) with the All Russian Scientific Research Institute for Experimental Physics (hereinafter referred to as "VNIIEF") to produce highly-enriched plutonium isotopes from USDOE-supplied plutonium feed material as specified in Table 1 of the Annex attached to this MOU;

NOW THEREFORE, the Parties hereby agree as follows:

Article 1
Objective of the MOU

(a) The purpose of this MOU is to establish an understanding between the IAEA and USDOE, through its National Nuclear Security Administration ("NNSA"), concerning the following, with the objective of USDOE providing the IAEA isotopically enriched plutonium-244 for use by the IAEA and its Network of Analytical Laboratories in nuclear safeguards forensic activities:

1) USDOE's supply of a quantity (as described in Article 2) of FP-33 plutonium feed material (hereinafter referred to as "FP-33") to the IAEA and its transfer to VNIIEF;

2) VNIIEF's performance of a test separation on a portion of the FP-33 and verification of separation efficiency and yield;

3) VNIIEF's separation of the bulk FP-33 to produce Primary Products 1 and 2 and Secondary Products (as set forth in the Annex attached to this MOU), and the transfer of these products to USDOE;

4) USDOE's production and certification of reference materials from Primary Products 1 and 2;

5) USDOE's provision of a portion of the Certified Reference Materials ("CRMs") produced from Primary Products 1 and 2 to the IAEA for its own use and for distribution to Network of Analytical Laboratories members; and

6) Disposition of the Secondary Products pursuant to agreement between USDOE and VNIIEF.

(b) Any information transferred by USDOE under this MOU will be limited to information in the public domain.

(c) The material supplied by USDOE, and products derived therefrom, are and will remain the property of the United States Government.

Article 2
Undertakings of USDOE

Subject to the provision for secure storage of Secondary Product materials at VNIIEF under IAEA seal and to the conclusion of an appropriate agreement between USDOE and VNIIEF setting forth the terms and conditions for the transfer of Secondary Product materials to USDOE, USDOE shall:

(a) Supply one portion of FP-33 containing 0.5g of plutonium dioxide (test portion) to the IAEA for transmittal to VNIIEF, on the condition of successful completion of the International Science and Technology Center ("ISTC") Project 1318, as evaluated by the Steering Committee established by Article 4 of this MOU;

(b) Supply one portion of FP-33 containing 4.5g of plutonium dioxide (production portion) to the IAEA for transmittal to VNIIEF on the condition of VNIIEF's successful separation of the 0.5g test portion as confirmed from isotopic analyses performed by the USDOE's New Brunswick Laboratory (USDOE-NBL) and other laboratories as designated by the Steering Committee;

(c) At its own expense ship separately the test portion and the production portion of FP-33 to the IAEA in an approved shipping container provided by USDOE or the IAEA;

(d) At its own expense, and in connection with the contract (2000-827) between the IAEA and VNIIEF, provide U.S. expert(s) to take part in witnessing the measurement and sub-sampling of the product solutions and/or solids at the VNIIEF facility;

(e) Provide management oversight and expert measurement in the certification of FP-33-derived spike materials using facilities at USDOE-NBL;

(f) Following production and certification of CRMs from Primary Products 1 and 2 as described in Table 2 of the Annex to, and Article 6 of, this MOU by USDOE-NBL,

provide to the IAEA sixty percent of the remaining units of CRMs; and

(g) Arrange with VNIIEF for the final disposition of the Secondary Products of isotopic separation.

Article 3
Undertakings of the IAEA

The IAEA shall:

(a) Convene and chair meetings of the Steering Committee, established as provided in Article 4 of this MOU;

(b) Provide a Secretariat for the Steering Committee at IAEA headquarters in Vienna;

(c) At its own expense ship separately the test portion and production portion of the FP-33 to VNIIEF, using an approved shipping container supplied by the IAEA, on approval of the Steering Committee;

(d) Provide oversight and monitoring, under the IAEA-VNIIEF Contract 2000-827, of VNIIEF's separation of the FP-33 feed materials into specified Primary and Secondary Products, and oversight of the Primary and Secondary Products during processing, storage, and shipping;

(e) Designate, with approval of the Steering Committee, qualified laboratories to verify the CRMs converted from part of the Primary Products 1 and 2 as defined in Article 6 and Table 2 of the Annex to this MOU;

(f) Arrange for IAEA and USDOE experts to be sent to witness the measurement and sub-sampling of the productions at the VNIIEF facilities; and

(g) Arrange for the shipping of Primary Products 1 and 2 to USDOE-NBL and for the secure storage of Secondary Products under IAEA seal at VNIIEF, as provided in Articles 5 and 6 of this MOU.

(h) Ensure, to the full extent of the IAEA's statutory powers, that the FP-33 provided by the United States shall not be used for nuclear weapons or any other nuclear explosive device, for research on or for development of any nuclear explosive device, or for any other military purpose.

Article 4
Establishment and Functions of the Steering Committee

(a) A Steering Committee shall be established, to provide oversight and management of the activities conducted under this MOU.

(b) The functions of the Steering Committee are to:

1) Monitor progress of ISTC Project 1318 concerning the "Production of Pu-244"; evaluate the success or failure of the ISTC Project, based in whole or in part on reports from Project 1318 review teams; monitor progress and evaluate any other related project with similar goals; advise USDOE and the IAEA in writing when it is appropriate for USDOE to send a test portion of FP-33 to the IAEA for shipment by the IAEA to VNIIEF;

2) Evaluate the verification measurements of isotope ratios obtained by mass spectrometry of a test separation by VNIIEF on a 0.5 g test portion of the FP-33, and evaluate relevant chemical and isotopic data, provided by VNIIEF from the separation work, for the purpose of assessing the separation efficiency;

3) Determine whether separation of the FP-33 (test portion) is successful, and whether it is appropriate for USDOE to send the FP-33 (production portion) to the IAEA for shipment by the IAEA to VNIIEF;

4) Monitor progress of the separation work at VNIIEF under the IAEA-VNIIEF contract cited in Article 3(e), through review of reports and other documentation and analytical verification;

5) Provide recommendations to the IAEA and USDOE regarding the use of portions of the Primary Products to produce CRMs and the disposition of Secondary Products;

6) Provide recommendations for the disposition of the remaining portions of Primary and Secondary Products in accordance with Article 5 of this MOU; and

7) Recommend plans for the distribution and use of CRMs provided to the IAEA from Primary Products 1 and 2 in accordance with Article 6 of this MOU.

(c) The Steering Committee will be composed of:

1) One representative from the IAEA - Department of Safeguards, who will chair Steering Committee meetings and who shall be a voting member;

2) One representative from the IAEA Safeguards Analytical Laboratory, who shall be a voting member;

3) One representative from the USDOE-NNSA, who shall be an international safeguards expert and shall be a voting member;

4) One representative from USDOE-NBL, who shall be a domestic safeguards and metrology expert and shall be a voting member;

5) One representative from VNIIEF, who shall be a non-voting observer;

6) One representative from the Institute for Reference Materials and Measurements, Geel, Belgium, who shall be a non-voting observer.

(d) Decisions of the Steering Committee shall be taken by consensus of the voting members.

(e) Meetings of the Steering Committee shall take place at least once a year at the IAEA headquarters in Vienna. Participants will be responsible for the cost of their travel to and participation in the meetings.

Article 5
Disposition of the Remaining Primary and Secondary Products

(a) The Primary Products are to be produced into CRMs as listed in Table 2 of the Annex to this MOU. CRMs will be distributed as provided in Article 6 of this MOU. The remaining Primary Products not produced into CRMs shall be stored at USDOE-NBL.

(b) Further production of CRMs from the remaining Primary Products shall be subject to approval by USDOE-NBL in consultation with the Steering Committee.

(c) DOE's provision of FP-33 as contemplated by this MOU is subject to the receipt of assurances by the Government of the Russian Federation, satisfactory to the United States Government, that the Secondary Products from the electromagnetic separators at VNIIEF shall be stored at VNIIEF under secure conditions and under IAEA seal, to ensure the integrity of the material. The final disposition of the Secondary Products shall be subject to arrangements between USDOE and VNIIEF.

Article 6
Disposition and Use of CRMs Produced from Primary Products 1 and 2

(a) CRMs to be produced from Primary Products 1 and 2 are listed in Table 2 of the Annex to this MOU.

(b) The IAEA will be provided with a quantity of CRMs as described in Article 2(f) of this

MOU for its own use and for distribution to the Network of Analytical Laboratories members following recommendations of the Steering Committee.

(c) Primary Products 1 and 2 will each be apportioned into individual aliquots for certification and distribution by USDOE-NBL following specifications listed in Table 2 of the Annex to this MOU. The bulk materials will be split into individual units for use in certification measurements and for use as CRMs. To obtain certified values, the analysis of a statistically-determined number of these units is required. A portion of the total number of units of each product will be used by USDOE-NBL and laboratories designated by the Steering Committee for verification measurements to certify the material. Sixty percent of the remaining CRM units prepared from the Primary Products will be allocated to the IAEA for its own use and for distribution to Network of Analytical Laboratories members based on recommendations from the Steering Committee. The remaining units of each product will be retained by USDOE-NBL for safeguards and metrology applications.

Article 7
Funding

The obligations of USDOE under this MOU are subject to the availability of appropriated funds.

Article 8
Annex

The Annex referred to and appended to this MOU constitutes an integral part of the MOU.

Article 9
Points of Contact

The Parties' points of contact for implementation of this MOU shall be representatives of the IAEA, USDOE-NNSA, and USDOE-NBL. All communications among the points of contact shall be made or confirmed in writing in English.

Article 10
Settlement of Disputes

Any dispute concerning the interpretation or application of this MOU shall be resolved by consultations between the Parties.

Article 11
Entry into Force, Duration and Extension

This MOU shall enter into force upon signature by both Parties, and (subject to Article 13) shall remain in force for 5 years. The Parties may extend this MOU for additional periods, by mutual agreement in writing.

Article 12
Amendment

This MOU may be amended by written agreement of the Parties.

Article 13
Termination

Either Party may terminate this MOU by giving 6 months' written notice to the other Party.

FOR THE DEPARTMENT OF ENERGY
OF THE UNITED STATES OF AMERICA:

Cherie P. Fitzgerald

Date: 4/15/2005

Place: Washington, DC

FOR THE INTERNATIONAL ATOMIC
ENERGY AGENCY:

Date: 21.04.05

Place: Vienna, Austria

ANNEX

TABLE 1. Specifications of the Primary and Secondary Products of the Separation

(1) First Pass Feed and Products - Abundances in Atomic Percent

Isotope	Feed (FP-33) 1June2003	Secondary Product #1 Pu-239	Secondary Product #2 Pu-240	Secondary Product #3 Pu-241	Secondary Product #4 Pu-242	Primary Product #1 Pu-244
Pu-238	0.19					0.000
Pu-239	2.19	76.03[f]				0.007
Pu-240	33.03		99.15[a]			0.187
Pu-241	1.18			82.93[f]		0.020
Pu-242	45.95				99.74[a]	0.228
Pu-244	17.46					99.5[b]
Total Amount (mg)	4400	12	188	13	260	100[c] +(x)*

* Additional Primary Product #1 is needed as feed material for the second pass enrichment.

(2) Second Pass Feed and Product - Abundances in Atomic Percent

Isotope	Feed					Primary Product #2 Pu-244
Pu-238	0.000					0.000
Pu-239	0.007					0.000
Pu-240	0.187					0.001
Pu-241	0.020					0.000
Pu-242	0.228					0.004
Pu-244	99.558					99.99[d]
Total Amount (mg)	(x)*					1[e]

Notes:

a. The acceptance range of the abundance is ± 1.0% (absolute).
b. The acceptance range of the abundance is ± 0.2% (absolute).
c. The acceptance range of the amount is ± 5 mg (absolute).d. The acceptance range of the abundance is ± 0.02 % (absolute).
e. The acceptance range of the amount is ± 0.05 mg (absolute).
f. The acceptance range of the abundance is ± 10% (absolute).

Table 2. Certified Reference Materials produced from Primary Products 1 and 2.

Material	Goal Accuracy	Use	Chem. Form	Pu Conc. in microgram/ mL	Unit Size (mL)	Number of Units	Amount Used (mg)
99.6% ^{244}Pu (Spikes)	0.03% (note 1)	IDMS total evap.	Nitrate	5	10	500	25 (^{244}Pu)
$^{242}Pu/^{244}Pu$ Spikes	0.03% (note 1)	IDMS Internal corr.	Nitrate	5	10	1000	25 (^{244}Pu)
99.99 ^{244}Pu Spikes	0.0001 (note 2)	Environ. Samples	Nitrate	0.1	10	500	0.5 (^{244}Pu)

Note 1: Accuracy of major isotope ratios.
Note 2:Sensitivity of minor isotope abundance.